

(12) United States Patent

Tertoolen et al.

US 9,638,539 B2 (10) Patent No.: May 2, 2017

(45) Date of Patent:

(54) NAVIGATION METHODS AND APPARATUS

(71) Applicant: TomTom International B.V., Amsterdam (NL)

Inventors: Simone Tertoolen, Rotterdam (NL); (72)Lilit Janpoladyan, The Hague (NL)

Assignee: TomTom Navigation B.V., Amsterdam

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

(21) Appl. No.: 14/143,595

(22)Filed: Dec. 30, 2013

(65)**Prior Publication Data**

US 2014/0114574 A1 Apr. 24, 2014

Related U.S. Application Data

(63) Continuation-in-part of application No. PCT/EP2012/062845, filed on Jul. 2, 2012.

(30)Foreign Application Priority Data

Jun. 30, 2011 (GB) 1111143.2

(51) Int. Cl.

G01C 21/34 (2006.01)G08G 1/123 (2006.01)G01C 21/36 (2006.01)

(52) U.S. Cl.

CPC G01C 21/367 (2013.01); G01C 21/3676 (2013.01); G01C 21/36 (2013.01); G01C 21/3635 (2013.01); G01C 21/3673 (2013.01)

(58) Field of Classification Search

CPC .. G01C 21/36; G01C 21/367; G01C 21/3635; G01C 21/3673; G01C 21/3676; G08G 1/0969

See application file for complete search history.

(56)References Cited

U.S. PATENT DOCUMENTS

| 4,675,676 A * 4,796,189 A * 4,914,605 A * 5,084,822 A * | 1/1989 4/1990 1/1992 | Takanabe et al. 340/995.15 Nakayama et al. 701/430 Loughmiller et al. 345/649 Hayami 701/455 | | |
|---|----------------------------|--|--|--|
| 5,444,618 A * | 8/1995 | Seki et al 702/5 | | |
| (Continued) | | | | |

FOREIGN PATENT DOCUMENTS

| DE | 102009022143 A1 | 12/2009 | | | |
|----|-----------------|-------------|--|--|--|
| EP | 0570223 A1 | 11/1993 | | | |
| | (Cor | (Continued) | | | |

OTHER PUBLICATIONS

English Machine translation for reference DE102009022143.* (Continued)

Primary Examiner - Nicholas Kiswanto Assistant Examiner — Rachid Bendidi

(57)ABSTRACT

A method of operating a navigation apparatus is provided. A calculated route is shown on a map display of the apparatus together with a current position indication. In one embodiment, a maximum map scale is determined which will result in a representation of the entire remainder of the route being shown within a visible map display area during travel along the route. In another embodiment, a map scale is set, and the map display is then controlled to maximize the amount of the remainder of the route which is shown within a visible map display area for the given map scale during travel along the route.

11 Claims, 6 Drawing Sheets

